

438 – Breathing, Biomechanics and Pain

With Steven Bruce and Kim Pritchard

This discussion explored the multifactorial role of breathwork in the management of musculoskeletal pain, systemic health, and biomechanical function. The presentation connected contemporary respiratory physiology with clinical assessment and practical interventions. Emphasis was placed on enhancing patient outcomes through simple, reproducible breathwork strategies integrated into biomechanical care.

Physiology of Breathing and Clinical Implications

The conversation began by grounding the clinical use of breathwork in its physiological underpinnings. Several key respiratory elements were addressed:

- **Carbon Dioxide Tolerance and the Bohr Effect:** The discussion explained how CO₂ acts not merely as a waste gas, but as a critical regulator of oxygen delivery via the Bohr effect. An individual's tolerance for rising CO₂ during breath-holds (measured using a BOLT score) was presented as a clinical tool to assess breathing efficiency.
- **Nitric Oxide and Nasal Breathing:** Nasal breathing was advocated over mouth breathing due to the production of nitric oxide in the nasal passages, which supports vasodilation, airway patency, and immune defence. Links were drawn to sleep quality and oxygen saturation.
- **Vagal Nerve and Parasympathetic Activation:** Attention was given to how diaphragmatic breathing can stimulate the vagus nerve, facilitating a parasympathetic state. This can be useful in managing sympathetic overdrive often seen in persistent pain, anxiety, and stress-related conditions.

These elements combined to show how dysfunctional breathing patterns can both exacerbate symptoms and reduce therapeutic responsiveness in MSK care.

Biomechanical Assessment of Breathing Patterns

The presenter then outlined how breathing patterns could be assessed in practice:

- **Postural Observation:** Practitioners were encouraged to begin with simple standing assessments to identify flared ribs, anterior loading of the thorax, and upper chest dominance.
- **Palpation and Movement Testing:** Direct palpation of the lateral and posterior rib cage during breathing, in positions such as prone, crocodile pose, or child's pose, revealed diaphragmatic activation—or its absence.

- **Functional Integration:** Tests included breath holds, single-nostril breathing, humming (to stimulate NO production), and breath pattern modification to evaluate autonomic effects.

Breathing was portrayed not as a secondary function but as a primary contributor to trunk stability, postural tone, and even spinal loading.

Practical Clinical Tools and Strategies

The speaker shared practical tools that clinicians could implement immediately:

- **BOLT Score Measurement:** Listeners were shown how to calculate this as an objective measure of CO₂ tolerance, relating to patient readiness for breath training.
- **Breathing Retraining Techniques:** Interventions included slowed nasal breathing, breath holds with movement, crocodile breathing, and use of tactile cues (e.g., bands around the ribcage) to encourage awareness.
- **Adaptation for Patient Type:** The speaker outlined modifications suitable for children, adults, athletes, and individuals with high levels of sympathetic tone or trauma history.

These tools were low-cost, easy to teach, and supported both in-session and self-directed practice.

Breathwork and Broader Health Impacts

In addition to MSK relevance, the speaker explored broader benefits of breathwork:

- **Digestive Health:** Diaphragmatic movement was linked to internal organ mobility and peristalsis, with potential to support reflux management when used alongside appropriate referrals.
- **Sleep and Recovery:** Mouth taping and positional breathing were discussed as ways to improve sleep quality and oxygen saturation, particularly in snorers or those with light sleep.
- **Stress Management:** Breath control was framed as a means to manage panic, anxiety, and emotional dysregulation. Teaching patients to use breath as a first step in distress tolerance was encouraged.

These aspects demonstrated the far-reaching impact of breath on systemic health, beyond pain relief.

Ethical and Professional Considerations

While the speaker offered many clinically applicable insights, care was taken to:

- **Avoid Overstatement:** There was a clear message to stay within scope and avoid making unsupported claims, particularly regarding sleep apnoea or

neurological conditions. Instead, such cases were to be referred appropriately.

- **Respect Autonomy and Safety:** Interventions such as taping or restricted-breath drills were always framed in the context of consent, education, and adaptation to patient capability and preference.
- **Promote Patient Empowerment:** Breathwork was presented as a self-management tool to build resilience, giving patients autonomy between sessions and encouraging engagement in their own care.

Relevance to Manual Therapy Practice

The discussion provided:

- **New Assessment Skills:** Integrating breathing analysis into postural and motion testing enhances diagnostic sensitivity.
- **Treatment Adjuncts:** Breath retraining can complement soft tissue, manipulation, or exercise programmes.
- **A Route into Behaviour Change:** Breathwork opens the door to conversations about stress, sleep, posture, and movement without relying on fear or over-pathologising.
- **Improved Patient Education:** Simple metaphors such as the "upside-down tree" lungs were used to enhance communication and retention

Conclusion:

This session offered a rich synthesis of physiology, clinical reasoning, and practical implementation, encouraging practitioners to view breath not as a passive background function but as a potent clinical tool. Integrating breathwork into manual therapy provides an opportunity to treat holistically, empower patients, and enhance functional outcomes.